mouth, or a weak dilution of the tincture of capsicum may be employed; about twenty-five drops to an ordinary-sized goblet of warm water will be found sufficiently stimulating. The domestic application of a roasted split fig to the gum increases the heat of the parts and invites suppuration to the surface to which it is used. Pursuing a natural course, the periodontitis ends in the formation of pus and the establishment of alveolo-dental abscess.

CHAPTER XIV.

THE TEETH AND THEIR DISEASES.

ALVEOLO-DENTAL ABSCESS.

PERIODONTITIS, or inflammation of the alveolo-dental membrane (considered in the previous chapter), when not resolved, has as its other termination, as there suggested, alveolo-dental abscess. To this condition, as a distinct one, attention is now to be directed.

Alveolar, or alveolo-dental, abscess has, of course, the history of an inflammation and suppuration anywhere in the body, having nothing peculiar to its history, except as special features associate with the anatomical characteristics and influences of the parts involved. It is a condition in which a tooth, diseased to the suppurative point in its enveloping membrane, or periodonteum, is discharging, through some convenient orifice of exit, pus secreted by or formed in such membrane.

The local features of alveolar abscess are to be described in a very few words. At the apex or somewhere about the root of the affected tooth, a degenerative thickening of the membrane occurs,—pyogenic membrane, as it was termed. (Fig. 88.) This, a diseased condition of the part, becomes shreddy and stringy, failing to organize the lymph constantly exuded or effused by it. The degeneration of this lymph is pus. As such membrane grows thicker and softer, and such pus accumulates, it becomes evident that space and vent are made necessities; thus absorption, through the pressure, is effected, and the matter, sooner or later, influenced in the direction it takes by the vulnerability of the surrounding osseous parietes, finds egress, giving generally that peculiar fistule in the gum, known as parulis, or gum-boil. The morbid process exhibited in an inflamed root-membrane consists in the accompaniment of the hyperæmia by a hyperplastic state of the tissue-cells, these cells increasing not only in number but in size. In this change it is that we find the explanation of the shreddy periodonteum seen more or less markedly upon all abscessed roots.

FIG. 88.

Shreddy sac of tooth abscess as met with in dental parulis.

A recognizable hyperæmia is not, however, a necessity for the excessive proliferation of connective-tissue cells; hence it is that epulic tumors frequently have origin in such hyperplasticity of the odonto-alveolar periosteum where expressions of vascular change have never been observed.

The formation and confinement of pus in a cavity so obstinately closed as

the alveolus of a tooth must necessarily inflict the severest suffering, and such pain is so constant an attendant of the condition, and is of such almost unbearable character, that any means calculated to abort or limit its persistence is to be hailed as a boon; it is to be taken for granted, judging from observation, that this is the severest form of odontalgia. The condition of throbbing pain, however, is confined to the period intervening between the accession of the acute inflammatory attack and escape of the pus; the period, properly speaking, of periodontitis,—a period lasting from two days to ten. Abscess fully formed, pain decreases to soreness. The treatment of the perfected alveolar abscess is very simple, at least as the indications are concerned; it consists simply in breaking up of the cyst and sac, and the excitation of an action sufficiently vigorous in character to fill with granulations, of organizable force, the fistule. Indications met, a practitioner can do nothing more.

The appreciation of the prophylaxis of alveolar abscess considers a treatment of the acute periodonteal trouble, of which the suppuration is seen to be only a result. This was considered in the previous chapter, leaving here little to add, except that if such means as were there recommended fail in securing resolution, more formidable, if thought desirable, are to be brought into requisition.*

As periodontitis is so frequently found abortable by scarifying the gums freely and deeply, and, after the congested vessels have relieved themselves, constringing the parts by applications of strong tincture of iodine, so parulis can very frequently be anticipated by the following trifling operation: With a sharp scalpel make a slight cut through the soft parts at the apex of the affected tooth. Next take up a spear-pointed drill and pierce the outer plate of the bone, thus entering the cavity in which the sac is being developed. Break up the sac, and, by means of a delicate tent, keep the wound patulous for a few days. Judgment is demanded, however, as to the time when such puncture is to be made; it is to anticipate the moment at which pressure from accumulation of pus commences. Done previously to this, more harm than good results.

Fig. 89 furnishes a correct idea of the cyst to be entered. A is a perforating bit used with the engine; B is an ordinary steel probe.

Exception is to be taken to the common practice of ordering warm fomentations to the face in incipient abscess; such practice is objectionable, resulting not infrequently in scars which much deform a patient. If the practitioner should not desire to adopt the operative suggestion offered, let him order a roasted fig or raisin directly to the affected part; either of these will do equally well the work of the poultice. Leeches, general blood-letting, vigorous antiphlogistic medication, any and every means that promises resolution, should come between the periodontitis and the abscess.

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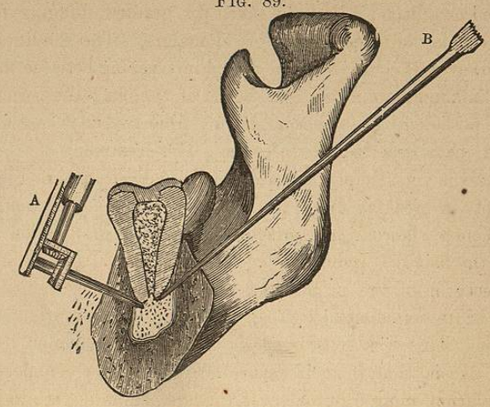
*More formidable would apply to the free use of diaphoretics, diuretics, cathartics and venesection.

The anomalies of alveolar abscess, if such a term be applicable to conditions not at all infrequent, may perhaps be best studied through the medium of

FIG. 89.



examples. A few are selected from the practice of the author and that of others. If, happily, they serve to throw light on any obscure case at present perplexing some inexperienced practitioner, the trouble of collecting them will be repaid.

A few years ago the author saw, in consultation with a Dr. B. of this city, Mrs. ——, who had been afflicted with a running ulcer at the apex of the chin for four years. During this period the lady had been under the care of some five or six different practitioners, and had twice been operated upon for supposed disease of the bone.

Suggesting that the origin and cause of this fistule might be found in some diseased tooth, assurance was given that these organs had been most carefully examined, and that there was not an unhealthy one in the mouth.

A superficial exploration seemed to verify the truth of the assurance. Not satisfied, however, by such examination, experiment was commenced by striking with a steel instrument each tooth separately; the patient thought that in the left inferior lateral incisor she experienced a sensation differing from that felt in the others.

Placing her now in the full sunlight, rays were reflected over the teeth by means of a hand-mirror; this test demonstrated that the incisor alluded to had lost its pulp,—it showed a slight opacity.

Now convinced that the disease was dental abscess, it was predicated on the demonstration that an opening made into the affected tooth would discover the death of its pulp; this was done, and the part found as anticipated. The offending organ was extracted, some necessary local attention given the sinus, and the patient was well in a week.

Comment on this case scarcely seems necessary; and yet it may not be

amiss to suggest the explanation of the deceptively healthy appearance of the dead tooth.

When the pulp of a tooth dies, discoloration of the enamel is a common result, this discoloration being caused from absorption of the dead matter by the tubuli of which dentine is made up. Occasionally, however, the opacity is so slight as to be scarcely perceptible, this depending on the dense character of the tooth,—not infrequently the tubuli being so occluded as to destroy their capillarity: the dead pulp is not therefore taken up. A very vascular tooth, having a dead pulp in its cavity, will soon be turned almost black. A tooth in which the death of the pulp has been sudden discolors always more markedly than where it has been preceded by a chronic inflammation, explanation being found in the absence of that renewal of the process of calcification which in the chronic condition is apt to occlude the tubuli.

A dead tooth, however, can always be distinguished by the tests given.

The pathology of this case is to be summed up very briefly. The death of the pulp provoked periodonteal difficulty. The inflammation, uncombated, resulted in alveolar abscess. The pus, after inducing by its presence the absorption of the bone, dissected its way under the soft parts down to the apex of the chin, where it discharged itself,—the abscess passed into the chronic stage; the annoying and formidable fistulous ulcer was of course, because of its character, rendered incapable of being healed by any directly local treatment, or that not addressed to the true seat of the trouble.

In another consultation the writer saw a Miss B., a young lady, nineteen years of age. In this patient, a fistule in the very centre of her hard palate had existed for some two years, giving rise to great uneasiness (as it had refused to yield to much treatment), a cancerous cachexia existing in the family. The denture in this mouth was also so complete as not to have attracted observation, every tooth being perfect, with the exception of a single molar, which had a small filling of gold on its grinding face. The filling in this tooth was removed, and the pulp found dead. Extraction was resorted to, and in three or four days all discharge had ceased. On the sixth day the patient was dismissed cured.

It is not at all uncommon to find the sinus of an alveolar abscess venting itself somewhere on the cheek. This is too frequently the result of inviting the matter to the surface by the warm applications made to the side of the face. When pus thus seeks the surface it is to be vented from the inside should such procedure be prudent. Experience exhibits, however, that little objection exists to an opening on the outside. Scar is not apt to result if nature's manner of cure be anticipated by use of the bistoury. Care must be taken not to wound the facial artery or the duct of Steno.

A case having likeness with the examples just quoted is recorded by Prof. Harrison Allen: A young man in whom the roots of a lower wisdom-tooth had been prematurely filled, was attacked with acute periodontitis, ostitis, and maxillary periostitis. This was sufficiently severe to excite inflammation in

the loose connective tissue between the mylo-hyoid muscle and the jaw. An abscess followed here, and the pus gravitated to form a collection about the hyoid bone, and from that point passed upward upon the face in the line of the facial artery. The abscess in addition pressed directly upward against the floor of the mouth, and caused unilateral glossitis, from the mechanical effects of which upon the organs of respiration the patient died. The duration of the extra-maxillary complication was but four days.

Abscesses, associated with the wisdom-teeth, sometimes pass in the direction of the parotid region; in these cases it is not uncommon to find the orifice of the fistule as low down as the clavicle, the unyielding character of the parotid fascia—a continuation, as it will be remembered, of the deep cervical—compelling this lengthened dissection.

A form of alveolar abscess, which may lead to false diagnostic premises, exists in cases where, from a relation of a diseased fang with the maxillary sinus, the discharge empties itself into that cavity, to be in turn voided into the naris. (See *Diseases of Antrum.*)

Another, and very curious, result of alveolar abscess is the formation of osseous cysts on the side of the jaw; the pus, instead of inducing the ordinary absorption, is provided for by the expansion of the outer plate of the bone. These cysts give little or no sense of fluctuation or crackling on pressure. There is no appearance of surrounding inflammation; the soft parts covering them do not differ in any respect from the adjoining tissue. Such cysts or tumors generally associate with teeth in which the pulps have been destroyed and the fangs filled with metal; they form sometimes very rapidly,—that is, when compared with solid tumors, for which they may be mistaken. The author has treated them where the cyst has enlarged to the size of a half hickory-nut in a few weeks. This rapid growth is particularly diagnostic. The easiest treatment of such cyst is, of course, the extraction of the offending tooth; but cure is to be obtained by opening them transversely and stuffing the cavity with lint saturated with tincture of iodine, or other stimulant; the cyst is thus obliterated, and the sac at the end of the fang destroyed, through the healthy reaction which the treatment excites. These cysts are not to be confounded with the sub-periosteal exudates frequently found overlying the site of diseased roots. Diagnosis lies in the use of an exploring needle.

Mr. Smith, in illustrating a lecture on alveolar abscess, notices the following cases:

A few years ago, he says, a middle-aged man asked his opinion about a fistulous sore which opened on the middle of his whisker of the right cheek. Mr. Smith introduced a probe, and finding that it came in contact with the fang of the last molar tooth of the upper jaw, persuaded the patient to allow him to extract it, on the promise that he should be well in a few days. On the tenth day the gentleman wrote, by post, to say that the discharge ceased the day the tooth was extracted, and that at the time of writing he was perfectly well.

He relates also the case of a young woman who came under his charge at the infirmary, with a fistulous sore in the fore part of the throat, within an inch of the sternum. It had been discharging upwards of a year. On probing it, the instrument could be passed in the direction of the molar of the lower jaw on the left side. On inquiry, the patient said that eighteen months before she had a tooth drawn, but the fangs had been left in the jaw. Afterwards an abscess formed, which descended lower and lower until it burst midway between the sternum and pomum Adami. Mr. Smith extracted the stump, the sinus still discharged for a week, then it got well without other treatment.

Mr. Smith alludes also to a case where a horse had been condemned to the knacker's yard, as being afflicted with the glanders, having a foul, offensive discharge of purulent matter from the nostrils, and being in the last stage of emaciation. A veterinary surgeon, finding that it could not masticate its food, examined the mouth, and detecting a carious tooth in the upper jaw, extracted it. The discharge ceased; the horse soon began to thrive, and got well. A cat belonging to the author has furnished a similar experience.

Mr. Fleischman (*British Medical Journal*) relates the following example: Miss Rose S., a little girl, aged five years, had been troubled about three months with a constant, though not profuse, discharge of slightly-purulent mucus from the right nostril; it appeared to be the sequel of a cold. The mucous membrane, so far as it could be examined, was healthy, and there were no indications of any morbid growth. She was ordered a strong injection of gallic acid, and took, concurrently, small doses of the sesquichloride of iron. The only advantage she derived was that the discharge lost its purulent character; in amount it remained about the same, though the treatment was long persevered in and other local astringents tried. I suspected, says Mr. Fleischman, there must be some undiscovered local irritation. Not being able, on careful examination, to find anything wrong in the nasal passages, I looked to the condition of the teeth, and finding the right upper canine carious, removed it. The discharge was much lessened on the next day, and in the course of one or two more disappeared altogether. Mr. Fleischman, although he does not seem to see that his case is simply one of alveolar abscess, but offers it as a good illustration of reflected irritation, truly remarks that it teaches us that the *fons et origo mali* is not always just where we might expect to find it.

The author has had, in his own practice, a number of cases where the pus of an alveolar abscess discharged itself into the naris; but the disease, in every case met with where the sinus passed in such direction, was associated with central incisor teeth. It is, however, to be inferred that other of the teeth might relate fistules, with the posterior aspect of the nares, dripping their discharge behind the veil of the soft palate. A number of such cases are on record.

Abscesses of this nature are not infrequently associated with the eruption

of the wisdom-teeth. The arch being too small to accommodate the advancing organ, it becomes, as a matter of necessity, an agent of irritation; inflammations of the most severe nature are thus oftentimes provoked, inducing, too commonly, trismus and abscess. (See *Trismus Dentium.*) Abscesses from this cause generally discharge about the neck of the tooth; they may, however, void themselves in other situations, as, for example, upon the face or neck. A case illustrative comes this moment to mind:—Dr. D., a medical gentleman, suffered for some time with heavy, dull pain in the right half of his lower jaw, attributed to two of his teeth, much decayed, which teeth, however, had been treated and plugged. Inflammation of a severe character finally developed, and, in defiance of all treatment, ran on to abscess, which abscess discharged upon the neck. The pus voided, relief, of course, was obtained. The sinus, however, continued to discharge, and at the time of consultation, the ulcer had become a source of much annoyance as well as deformity. This case had been examined by various friends of the gentleman, and, while all pronounced it alveolar abscess, all associated it with the treated teeth. The removal of a developing dens sapientæ, a single cusp alone of which presented, caused the fistule to heal in a single week.

A complication sometimes met with in abscess discharging upon the cheek, and of which it is most important that note be taken, consists in a relation of the sinus with the duct of Steno. Within the past few years the writer has met with several cases of this nature, and by the operation required for salivary fistula has been enabled readily to cure them after the failure of every device not entertaining an appreciation of such condition. It is to be impressed that such fistulæ deceive in the very limited salivary discharge, this fluid being easily overlooked in its relation with the pus; experience leads to the inference that the opening into the duct is not infrequently of the most diminutive calibre. Where such a case is recent, it is proper to attempt a cure through the granulative process, trusting by such means to cover in the break of the duct. To accomplish this, no better means is to be employed than daily touching the parts with tincture of iodine or with crystals of the chloride of zinc, it being of course understood that the dental relation of the disease has been previously cured. If such treatment fail, and this will be found most likely, then an operation becomes necessary. (See *Salivary Fistule.*)

Dental abscess not infrequently exists where the discharge is exclusively through the foramen of the tooth; that orifice being enlarged. The gums in these cases may be unaffected, affording no signs of disease, the evidence of the lesion being perhaps alone in a peculiarly disagreeable taste experienced by the patient. To cure these discharges, it may be all sufficient to throw the required injection through the canal of the tooth; but, should this fail, the method of entering the cyst through the alveolus is to be tried. To so enter such a cyst, a very delicate trephine is employed, or, what commonly answers every purpose, a spear-shaped drill may be passed through the outer

plate. Incising the gum over the apex, the drill is simply to be rotated into the cyst; precaution, however, is to be taken that none of the bony particles be allowed to remain, adding their quota of offence. This is guarded against by the free use of a syringe.

An alveolar discharge, which may be termed false abscess, is met with frequently in association with alveoli into which salivary calculus is intruding. In these cases no difficulty is experienced in the diagnosis; the discharge is seen about the necks of the affected teeth, the gum is more or less puffy, and the irritating deposit evident enough. To cure cases of this kind, it is alone necessary to scale or cut away the offending agent, and, after making a few incisions through the congested and debased gum, stimulate the parts by such applications as seem indicated. Few medicaments are more reliable in this direction than the dilute aromatic sulphuric acid, or this combined in equal proportions with the tincture of capsicum. It is found, however, not infrequently the case that the deposit has so destroyed the sockets of the teeth that no cure is possible outside of extraction. (See *Salivary Calculus.*)

Chronic alveolar abscess, resisting local treatment, is to be viewed commonly as of constitutional association. In persons who are laboring under the effects of a mercurial poisoning, the cases are found most resistive; indeed, in many instances, it is felt to be useless to make any attempt to save the affected teeth, the organs being absolutely thrust from their sockets and falling into the mouth. Where not too loose, however, the gums are to be incised every few days in a vertical direction, and attempts made to resolve the turgidity and puffiness by paintings of the tincture of iodine and capsicum, alternated with washes of chlorate of potash and cologne.

℞.—Potassii chloratis, ℥ss;
Aquæ Colonæ, ℥j;
Aquæ, ℥vij. M.
Sig.—Use many times daily.

Internally the chlorate of potash may be employed in doses of fifteen grains, repeated three times daily.

℞.—Potassii chloratis, ℥iij;
Aquæ, ℥viij. M.
Sig.—Tablespoonful as a dose.

Another prescription is as follows:

℞.—Tincturæ myrrhæ et capsicii compositæ, ℥j.
Sig.—To be used in the proportion of 5 drops to ℥j of water.

The rheumatic diathesis is to be recognized as at least a predisposing cause of alveolar abscess, and one which at times forces itself on attention in treatment of the condition. As this toxical influence is recognized as having affinity with periosteal tissue, so there is no reason to doubt that occasionally it is the resistive agent in the cure of such conditions. A similar view will

also be found to hold good of the malarial poison, and, indeed, it very well may be, of all the other toxical expressions. Not that it is to be affirmed that such poisons have necessarily, in all instances, a direct relation, but that, being depressent to the system at large, they antagonize that reparative influence, without which parts may not restore themselves; precisely, if an illustration be needed, as a venereal ulcer, however proper and vigorous the local treatment, may refuse to be made well until systemic influences are considered and antagonized.

Gout is another constitutional predisposition to chronicity in alveolar abscess, just as it is a frequent excitant to pulpitis. An abscess which refuses to respond to any direct medication yields, with such predisposition, to a few doses of colchicum. Defying abscesses of this nature are oftentimes found to give way to the alterative influence of a week at the seashore, or a trip to the mountains.

In chronic abscess the discharge must necessarily continue so long as the periodonteum remains in its pathological state. It is therefore always necessary in association with any systemic treatment which it may be desirable to adopt, to break up the local lesion. To accomplish this, no better means is to be employed than tearing the sac to pieces by means of a delicate, temperless excavator passed through the sinus. After such breaking up, the part is to be syringed daily with an aqueous or vinous dilution of the ordinary officinal tincture of iodine,—about half and half being a good proportion. Another most excellent agent is found in the chloride of zinc. Of this salt, a solution of three grains to the ounce of water may be employed, a tent of cotton being saturated and carried into the cyst, or, charging with a few drops the ordinary hypodermic syringe, the fluid may be thrown into the cavity. Other local medicaments are found in nitrate of silver, sulphate of copper, tincture of capsicum, permanganate of potash, in the passage of the electro-galvanic current, in carbolic acid, in creasote, in alcohol, *et hoc genus omne.* The indication lies in the direction of stimulation.

Where an abscess discharges itself exclusively through the pulp-canal, the very best plan of treatment is to make a counter-opening in the gum and proceed as directed for the abortion of the acute state of the disease, using, besides this means, injections and tents until all discharge ceases; or, if objection exist to this, threads of silk saturated with the medicament selected may be carried into the canal. Another and better mode than the use of the threads is, however, to introduce into the canal a plug of gutta-percha, in which a hole is to be made of a size just sufficient to receive the nozzle of a delicate syringe. Thus directed and controlled, injections may be forced through the foramen. Any treatment, however, except that by the counter-opening, is seldom found satisfactory.

A tooth having such discharge through its canal, and thus incapable of bearing a filling, may have such filling retained without response by making the counter-outlet through the alveolar wall. Such a treatment is frequently